



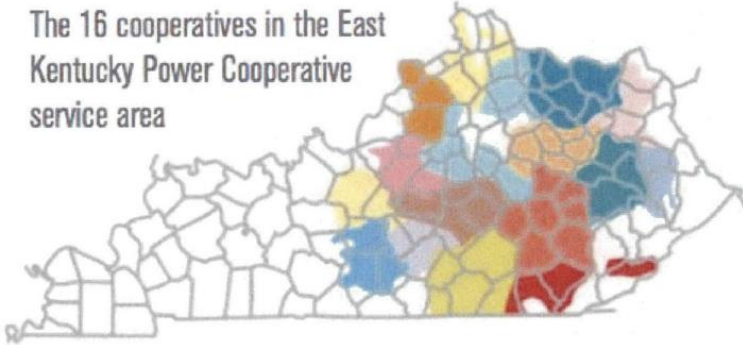
# East Kentucky Power Cooperative

***Consumer Education***

***Presented by: Tom Castle, PE  
Senior Engineer***

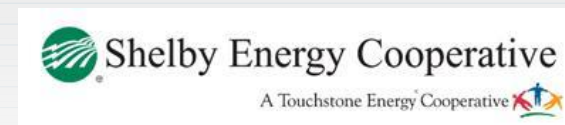
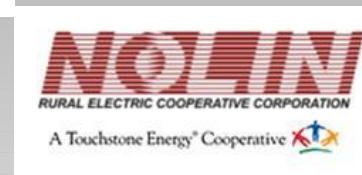
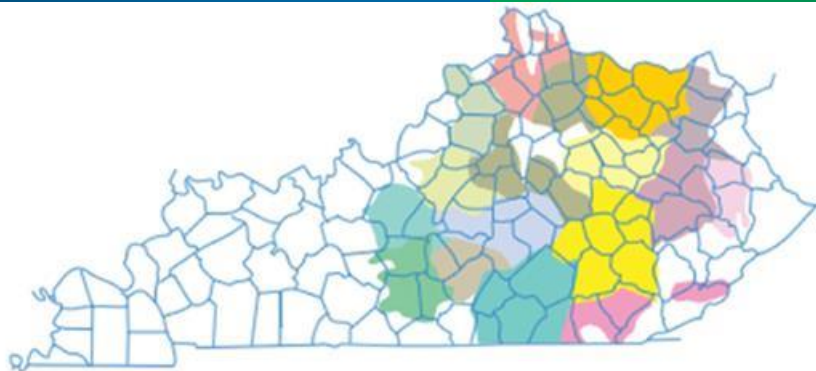
# EKPC's Load Mix

The 16 cooperatives in the East  
Kentucky Power Cooperative  
service area



2016	
Total	12,647 GWH
Residential	57%
Commercial	16%
Industrial	28%

- Integrated Into PJM in 2013
- 3500 MW Generation
- Winter Peaking
- Summer Peak with PJM 2300 MW



# Topics

- Utility Regulation in the State of Kentucky
- Demand vs. Energy
- Rate Types
- Power Factor Penalties

# Energy vs. Demand

- Energy is a Measurement of “work”
  - Mechanical Energy = Force X Distance
  - Electrical Energy = Watts x Time
- Demand is the measurement of Energy Usage Speed
  - Watts



\* Filling a swimming pool \*

# Power Economics

- Generation
  - Some fixed cost
  - Mostly Variable cost
- Transmission
  - Mostly Fixed Cost
- Distribution
  - Mostly Fixed Cost

# Kentucky Public Service Commission

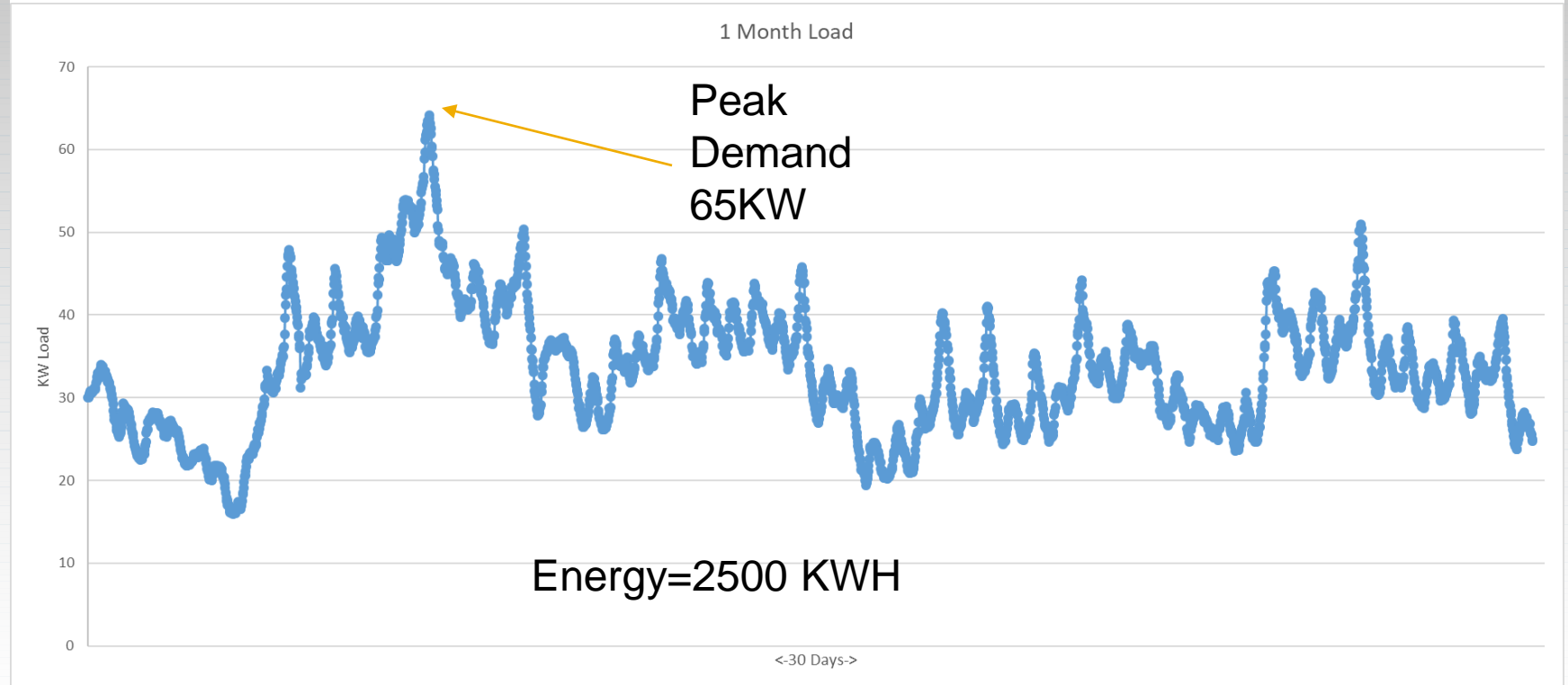
- Regulates most utilities in Kentucky
  - Does not regulate municipalities or the TVA supplied cooperatives
- All tariffs and special contracts must be approved by the PSC
- All tariffs and special contracts are posted on the PSC's website

# Rate Models

- Pure Energy Cost
  - Residential and Small Commercial
  - Time-of-Day Rates
- Energy and Demand
  - Small commercial
  - Large commercial
  - Industrial
  - Time-of-Day Rates

# Demand is an Opportunity not a Burden!

- Clark Energy
  - Residential Rate: \$.08992/KWH
  - Small Commercial Rate: \$.05865/KWH \$6.21/KW

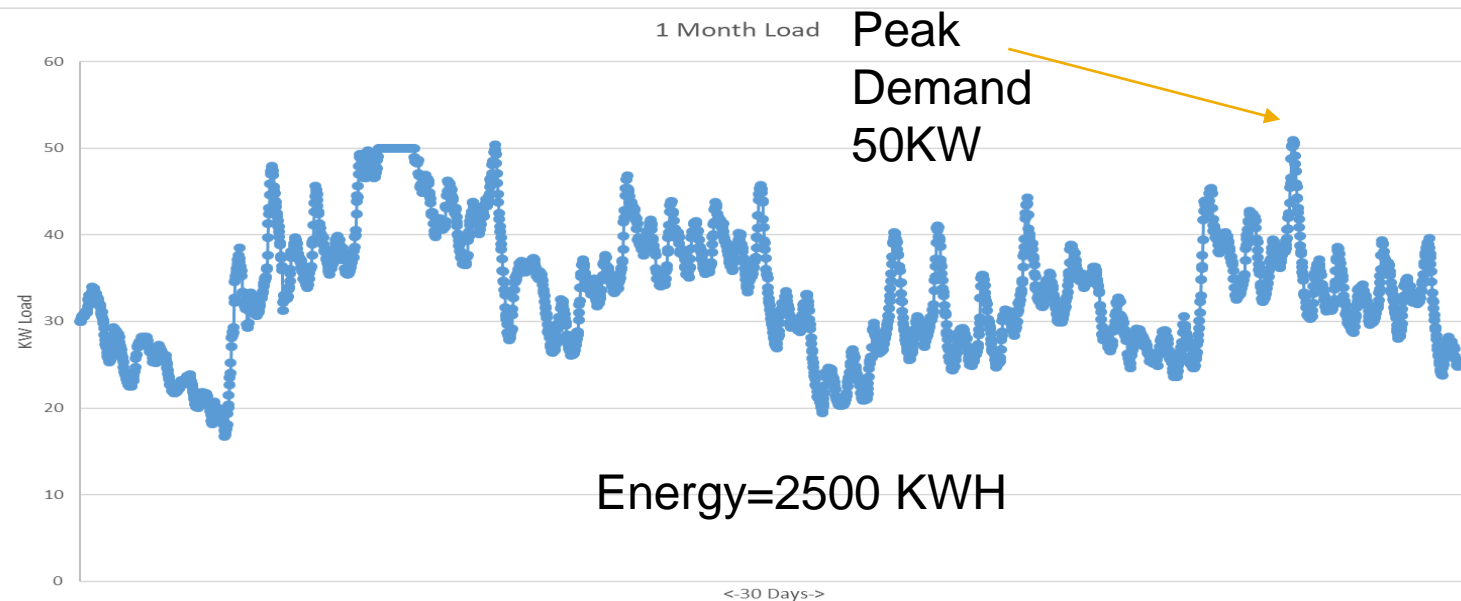
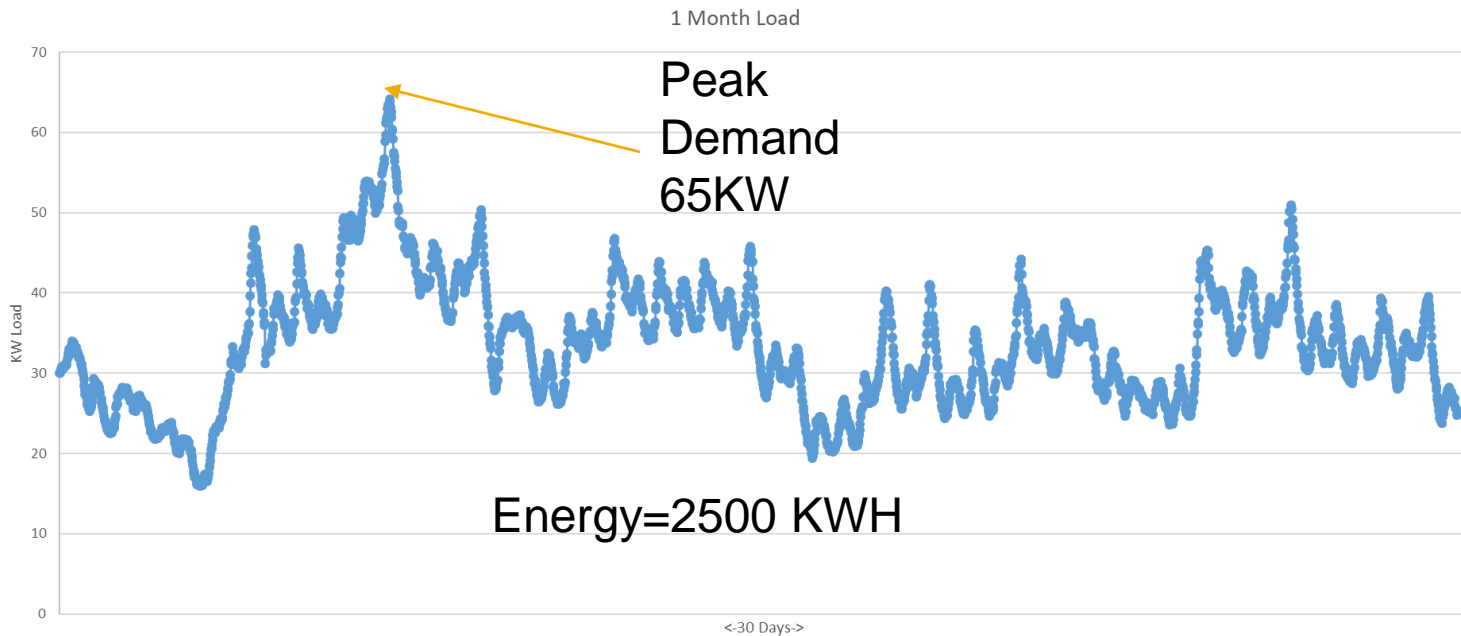


# Rate Comparison

- Clark Energy
  - Residential Rate: \$.08992/KWH
  - Small Commercial Rate: \$.05865/KWH \$6.21/KW

Metered Values			
Peak Demand (KW)	65		
Energy (KWH)	25000		
	Demand Charge	Energy Charge	Total
Residential Rate	\$0	2248	\$2,248
Commercial Rate	403.65	1466.25	\$1,870

# Load Shifting



	Demand Charge	Energy Charge	Total
Commercial Rate (before)	403.65	1466.25	\$1,870
Commercial Rate (after)	310.5	1466.25	\$1,777

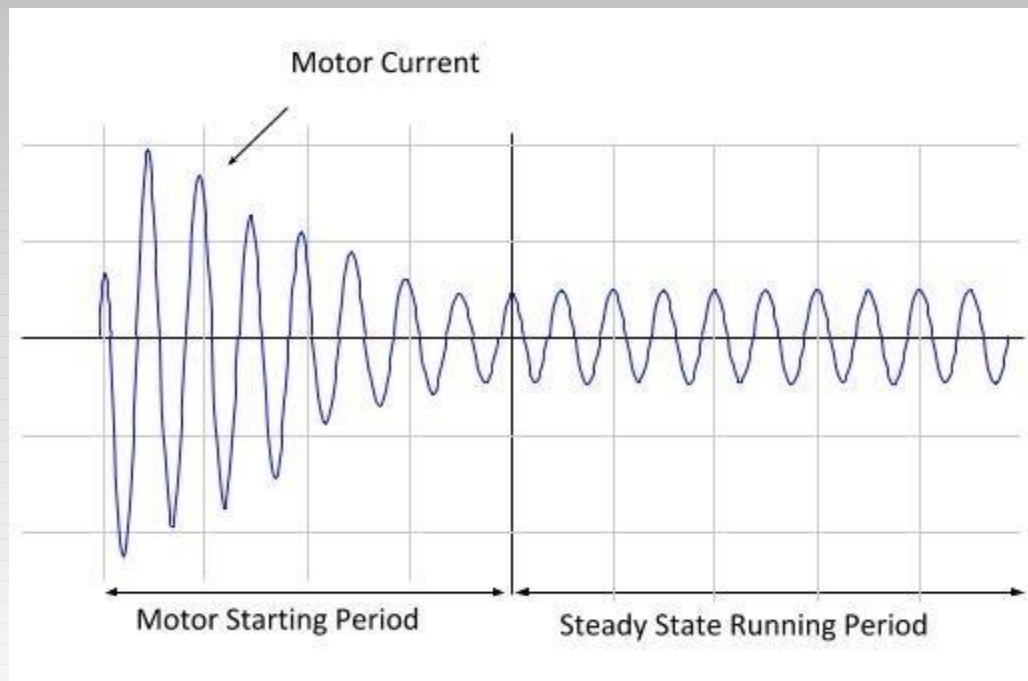
# Different Demand Measurements

- Typically 15 Minute
  - Rolling Block
  - Every 15 minute interval
- Max Demand
  - Typical
- Coincident Demand
- Ratchet Demand

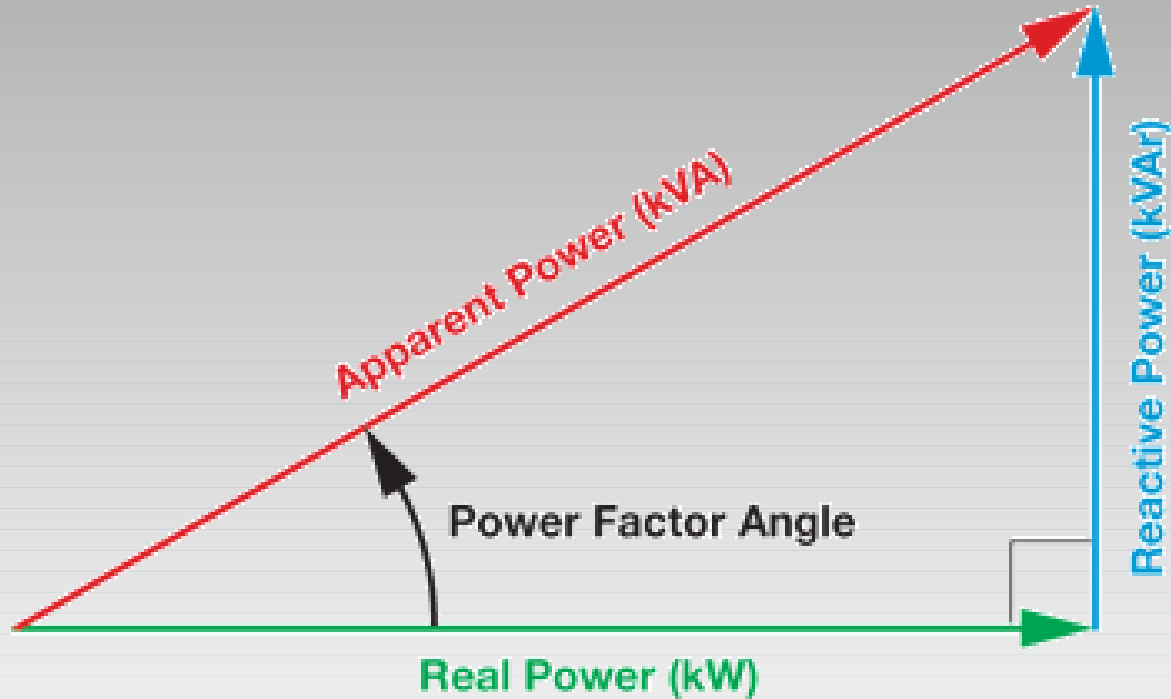
Can be subject to  
Contract values and  
minimum values

# Misconceptions

- “Motor Starts Impact Demand”



# “Flavors” of power



\*All Power System Components are rated in KVA\*

# Power Factor



$$PF = \frac{kW}{KVA}$$

$$PF = \frac{kWH}{KVAH}$$

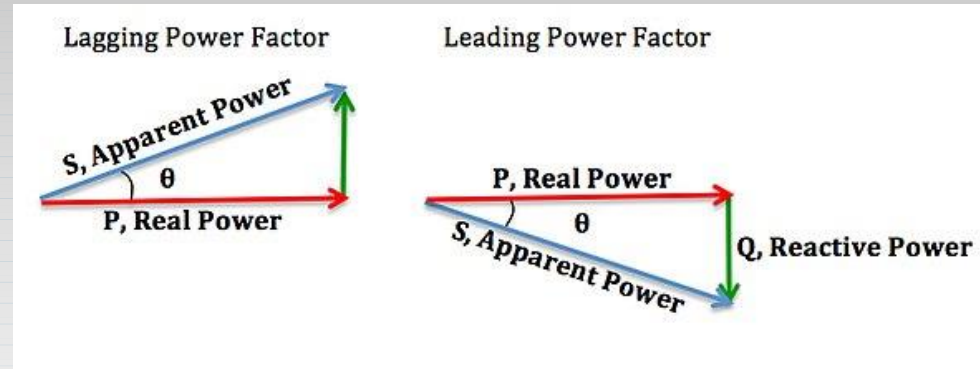
# Power Factor Correction

- Power Factor Penalties vary by Utility
- A common method to penalize is by scaling the billed demand by a factor of  $.9/PF \times \text{Billed Demand}$

PF	0.8
Metered Demand	100
Billed Demand = $100 \times (.9/.8)$	112.5
Demand Charge	\$698.63

# Fix PF

- Power Factor Correction Capacitors



[https://en.wikipedia.org/wiki/Power\\_factor](https://en.wikipedia.org/wiki/Power_factor)

# Sizing Capacitors

	Metered Values	Target	Capacitive KVAR Needed
PF	0.8	0.9	
KW	100.0	100.0	
KVAR	75.0	48.4	26.6



# Questions and Discussion